System Assessment and Validation for Emergency Responders (SAVER)

Standoff Radiation Detectors Focus Group Report

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SAVER

System Assessment and Validation for Emergency Responders

Prepared by the National Urban Security Technology Laboratory

FOREWORD

The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions. Located within the Science and Technology Directorate (S&T) of DHS, the SAVER Program conducts objective assessments and validations on commercial equipment and systems, and provides those results along with other relevant equipment information to the emergency response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in the DHS Authorized Equipment List (AEL). The SAVER Program mission includes:

- Conducting impartial, practitioner-relevant, operationally oriented assessments and validations of emergency response equipment; and
- Providing information, in the form of knowledge products, that enables decision-makers and responders to better select, procure, use, and maintain emergency response equipment.

Information provided by the SAVER Program will be shared nationally with the responder community, providing a life- and cost-saving asset to DHS, as well as to Federal, state, and local responders.

The SAVER Program is supported by a network of Technical Agents who perform assessment and validation activities. Further, SAVER focuses primarily on two main questions for the emergency responder community: "What equipment is available?" and "How does it perform?"

As a SAVER Program Technical Agent, the National Urban Security Technology Laboratory has been tasked to provide expertise and analysis on key subject areas, including chemical, biological, radiological, nuclear, and explosive weapons detection; emergency response and recovery; and related equipment, instrumentation, and technologies. In support of this tasking, operational needs and evaluation criteria for standoff radiation detectors (SRDs) were gathered from a focus group and are highlighted in this report. SRDs fall under the AEL reference number 07RD-04-SGND titled Detector, Gamma/Neutron, Standoff.

Visit the SAVER website at www.dhs.gov/science-and-technology/SAVER for more information on the SAVER Program or to view additional reports on SRDs and other technologies.

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1. INTRODUCTION

A standoff radiation detector (SRD) is a device that can locate a radiation source from a distance and determine whether or not it constitutes a threat. Although no formal definition exists for what does and does not constitute an SRD, they are typically considered to have the following characteristics:

- They are larger than personal and handheld radiation detectors;
- They can determine the direction of radiation sources;
- They can distinguish threats from background and normally occurring radiation;
- They are vehicle mounted; and
- They can detect radioactive sources from a standoff distance that depends on the application.

SRDs are used by law enforcement and other first responder personnel in a wide variety of applications on land, sea, and air. On land, they can be used to scan a large area such as a parking lot for a missing, stolen, or illegal radiological source. They can scan vehicle traffic along roads and at chokepoints, and vehicle and pedestrian traffic at large gatherings such as concerts and sporting events. When mounted on boats, they can scan harbors, marinas, other boats, and large ships. They can also protect coastline areas where a nuclear device could be smuggled into the country. Aircraft-mounted SRDs can survey for radiological plumes, find sources on the ground, and cover remote border crossings.

The System Assessment and Validation for Emergency Responders (SAVER) Program plans to conduct a comparative assessment of SRDs to provide emergency responders with information that will assist them with making operational and procurement decisions. The SRD SAVER assessment will be conducted by emergency response professionals based on the recommendations presented in this report.

1.1 Focus Group Participants

In support of the comparative assessment, a focus group met on September 18, 2012, with the primary objectives of recommending evaluation criteria, product selection criteria, products, and possible scenarios for the assessment. Another objective was to develop criteria for making acquisition and operational decisions. Eight emergency responders from various jurisdictions participated in the focus group. The participants, highlighted in Table 1-1, possessed strong backgrounds with law enforcement, hazardous materials, and emergency services. All participants had multiple years of experience operating SRDs. This knowledgeable and experienced focus group allowed for meaningful and productive discussions.

All of the participants acknowledged they did not have an employment or financial relationship that could create a potential conflict of interest with the work to be performed by the SAVER Program. Participants signed a nondisclosure agreement and a conflict of interest statement.

Table 1-1. Focus Group Participants

Participant's Organization	Years of Experience	State
County Police Department	31	NY
City Fire Department	21	NY
State Police Department	20	NJ
Interstate Police Department	19	NY, NJ
City Police Department	19	NY
Interstate Police Department	14	NY, NJ
State Environmental Protection Agency	11	NY
State Environmental Protection Agency	8	NY

2. FOCUS GROUP METHODOLOGY

The focus group opened with an overview of the SAVER Program, a briefing on the SRD project, and an overview of the focus group goals and objectives. Then, a facilitator led the focus group to develop and discuss four sets of recommendations:

- Evaluation criteria recommendations – General criteria that are important to consider when making acquisition or operational decisions;
- Product selection criteria recommendations – Criteria that identify specifications, attributes, or characteristics a product should possess to be considered for the assessment;
- Product recommendations – Products and vendors that are relevant to the emergency responder community and should be candidates for inclusion in the assessment; and
- Assessment scenario recommendations – Operational scenarios for assessing the products in order to evaluate their performance.

Figure 2-1 highlights the process followed to develop these recommendations.

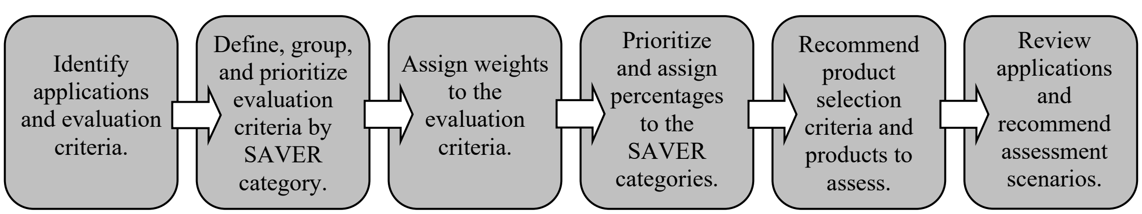

Figure 2-1. Focus Group Process

Focus group participants first identified applications in which SRDs are commonly used. Next, the focus group participants identified and defined evaluation criteria, which were then grouped and prioritized in the SAVER categories: affordability, capability, deployability, maintainability, and usability. The SAVER categories are defined as:

- Affordability – Criteria related to life-cycle costs of a piece of equipment or system;
- Capability – Criteria related to the power, capacity, or features available for a piece of equipment or system to perform or assist the responder in performing one or more relevant tasks;
- Deployability – Criteria related to the movement, installation, or implementation of a piece of equipment or system by responders at the site of its intended use;
- Maintainability – Criteria related to the maintenance and restoration of a piece of equipment or system to operational condition by responders; and
- Usability – Criteria related to the quality of the responders' experience with the operational employment of a piece of equipment or system. This includes the relative ease of use, efficiency, and overall satisfaction of the responders with the equipment or system.

Once the evaluation criteria were prioritized within the SAVER categories, focus group participants assigned a weight for each criterion's level of importance on a 1-5 scale, where 5 is of utmost importance and 1 is of minor importance. Table 2-1 highlights the evaluation criteria weighting scale.

Next, considering the evaluation criteria in each category, the focus group participants ranked the SAVER categories in order of importance. Based on the ranking, a percentage was assigned to each category to represent its level of importance.

Next, the focus group participants discussed product selection criteria. The focus group also discussed products from a list of commercially available SRDs that are candidates for an assessment. Lastly, the focus group participants reviewed the applications of SRDs identified at the beginning of the focus group session and recommended operational scenarios for the assessment.

Table 2-1. Evaluation Criteria Weighting Scale

Weight	Definition
5	**Of the utmost importance** *"I would **never** consider purchasing a product that does not meet my expectations for this criterion or does not have this feature."*
4	**Very important** *"Meeting my expectations for this criterion or having this feature would **strongly influence** my decision to purchase this product."*
3	**Important** *"Meeting my expectations for this criterion or having this feature would **influence** my decision to purchase this product."*
2	**Somewhat important** *"Meeting my expectations for this criterion or having this feature would **have a small influence** on my decision to purchase this product."*
1	**Of minor importance** *"Meeting my expectations for this criterion or having this feature **may influence** my decision to purchase this product."*

3. EVALUATION CRITERIA RECOMMENDATIONS

The focus group identified 49 evaluation criteria and concluded that capability was the most important SAVER category, followed by affordability, maintainability, usability, and deployability. Table 3-1 presents the category weights, the evaluation criteria, and the evaluation criteria weights.

Table 3-1. Evaluation Criteria

SAVER CATEGORIES				
Capability	**Affordability**	**Maintainability**	**Usability**	**Deployability**
Overall Weight 30%	Overall Weight 25%	Overall Weight 20%	Overall Weight 15%	Overall Weight 10%
Evaluation Criteria				
Gamma Detection Weight: 5	**Initial Cost** Weight: 5	**Legally Defensible Data** Weight: 5	**Simplicity of Operation** Weight: 5	**Low Visibility Operation** Weight: 5
Neutron Detection Weight: 5	**Maintenance Cost** Weight: 5	**Frequency of Repair or Service** Weight: 4	**Intuitive Display** Weight: 4	**Power Source Options** Weight: 5
Isotope Identification Weight: 5	**Terms of Service Contract** Weight: 4	**Quality of Customer Support** Weight: 4	**Ease of Use in Moving Vehicle** Weight: 4	**Battery Operation Time** Weight: 5
Detection Sensitivity Weight: 5	**Training Cost** Weight: 3	**Amount of Downtime** Weight: 3	**Recall Mode** Weight: 4	**Vehicle Adaptability** Weight: 4
Field-of-View Weight: 5	**Repair Cost** Weight: 3	**Functional Test with Check Source** Weight: 3	**Alarms** Weight: 3	**Equipment Size** Weight: 4
Position Capability Weight: 4	**Trade-in Value/ Disposal Options** Weight: 3	**Ease of Troubleshooting** Weight: 2	**False Positive Alarm Rate** Weight: 3	**Ruggedness** Weight: 4
Reachback Capability Weight: 4		**Modular Design** Weight: 2	**Use by Single Operator** Weight: 2	**Environmental Specifications** Weight: 4
Source Localization Weight: 3		**Time that Vendor Supports Model** Weight: 2	**Spectral Information Display** Weight: 2	**Connector Quality** Weight: 4
Wireless Capability Weight: 2		**Service Location Flexibility** Weight: 2	**Training Mode** Weight: 2	**Resistance to Radio Frequency Interference** Weight: 4

SAVER CATEGORIES				
Capability	**Affordability**	**Maintainability**	**Usability**	**Deployability**
Overall Weight 30%	Overall Weight 25%	Overall Weight 20%	Overall Weight 15%	Overall Weight 10%
Evaluation Criteria				
Remote Paging Weight: 2		**Software Updates** Weight: 2	**Computer Compatibility** Weight: 2	**Temperature Stability** Weight: 3
Command Center Connectivity Weight: 2				
Environmental Mode Capability Weight: 2				
Imaging Capability Weight: 1				

3.1 Capability

Thirteen capability criteria were identified and defined by the focus group as follows:

Gamma detection refers to the overall capability of the system to detect and measure the energy of gamma rays. This category includes features such as the number of gamma detectors; their type, size, range, and efficiency; and the resolution and quality of gamma spectra produced by the system. Focus group participants considered gamma detection an essential function of an SRD.

Neutron detection refers to the overall capability of the system to detect neutrons emitted from a radiological source. This category includes features such as the number of neutron detectors; their type, size, and efficiency; and their susceptibility to interference from gamma rays. It also includes the type and amount of moderation material used to slow down fast neutrons in order to permit detection. While neutron detection is often considered an optional feature in radiation detection systems, the focus group felt that it is an essential function of an SRD.

Isotope identification refers to the ability of the system to identify the isotope or isotopes of the radioactive material causing the alarm. Focus group participants indicated that the system software should contain a comprehensive and customizable library of isotopes and categorize each identified isotope as industrial, medical, natural, or special nuclear material. Isotope identification was considered an essential feature.

Detection sensitivity refers to the ability to detect a small radiation signal from a radioactive source. Detector size and efficiency are the major factors affecting detection sensitivity. A detector with large volume and high efficiency will collect more counts from a remote source compared with a smaller or less efficient detector. Focus group participants did not recommend a specific sensitivity, but indicated that it is important to have an appropriate sensitivity for the application intended.

Field-of-view refers to the angular range viewed by the detector within which a source can be detected in both the vertical and horizontal planes. A 360-degree horizontal field-of-view would allow detection of a source placed at any angle from the front of an SRD vehicle. A wide vertical field-of-view would allow a source to be detected at a high angle of elevation. Focus group participants felt that a vertical field-of-view is just as important as a horizontal field-of-view. They preferred at least a 45-degree vertical field-of-view.

Position capability refers to the ability to determine the latitude and longitude of an SRD vehicle through use of a global positioning system receiver or a similar technology. Focus group participants wanted the ability to save and recall radiation data with position information.

Reachback capability refers to features that allow the system operator to send spectral files to another location for analysis. Because isotope identification by software is never foolproof and can give uncertain results, focus group participants wanted SRD systems to have an easy method for sending data to a reachback facility for further analysis. It can involve sending the files by wireless connection or offloading to a laptop with wireless capability. Participants preferred a software feature or utility that automatically captures the latest background and calibration file and sends those files with the unknown spectrum.

Source localization refers to the ability of the system to assist in determining the direction of the radioactive source. Focus group participants stated that they expect something better than just right- or left-side indicators. Possible methods for doing this include imaging, detector arrays, and a finder mode with audible high-pitched chirping for higher readings.

Wireless capability refers to the ability of the system to transmit data to a remote computer through an appropriate wireless technology such as Bluetooth or Wi-Fi (IEEE 802.11).

Remote paging refers to the capability of transmitting alarms to a separate handheld unit. This should be implemented as an optional feature with the ability to turn it on and off.

Command center connectivity refers to the capability of connecting and exchanging data with an agency’s command and control center. This should be implemented as an optional feature with the ability to turn it on and off.

Environmental mode capability refers to the system having modes for operating in different environments, such as urban, rural, and marine. In systems with this capability, each mode uses a separate algorithm to interpret current and background radiation levels and determine if there should be an alarm. Focus group participants felt that this is important because their experience has shown that a single algorithm does not work effectively in all environments.

Imaging capability refers to the ability of the system to produce an image that indicates the location and intensity of the source. Imaging may also allow detection of a source that produces an exposure rate less than the background level. Even though this capability was not commercially available at the time of the focus group session, participants weighted this category as though it were.

3.2 Affordability

Six affordability criteria were identified and defined by the focus group as follows:

Initial cost refers to the up-front purchasing cost of the system and all necessary accessories. The system may or may not include a vehicle. If it does not include a vehicle, it should include all necessary parts and accessories for mounting the equipment in a separately purchased vehicle. Focus group participants indicated that due to budget pressures, SRD systems must have an affordable and competitive initial cost.

Maintenance cost refers to the accumulated costs involved with keeping the purchased equipment at operational status. This includes routine maintenance of the vehicle if purchased, detector calibration, and software upgrades. It also includes technician travel for maintenance purposes, which, according to the focus group, can involve high costs.

Terms of service contract refers to the availability of an appropriate service contract that will allow emergency response organizations to maintain the equipment while minimizing ongoing expenses. Focus group participants preferred a long-term contract that covers parts, labor, and calibration. They stressed the importance of being able to pay for a service contract up front with grant money because they have very limited annual budgets for equipment maintenance.

Training cost refers to the accumulated costs associated with training operators to use the equipment.

Repair cost refers to the accumulated costs associated with making repairs to the equipment, including replacement parts, labor, technician travel, and shipping to a repair facility. Focus group participants noted the importance of the location of the repair facility in keeping the repair cost low, as some vendors will only make repairs at their own facility, which may be across the country or overseas.

Trade-in value/disposal options refers to the ease of disposing of the equipment and the amount of money that can be recouped after its life cycle has ended. Focus group participants noted that detection vehicles are often difficult to dispose of and that vendors should provide disposal options.

3.3 Maintainability

Ten maintainability criteria were identified and defined by the focus group as follows:

Legally defensible data refers to whether or not the vendor provides equipment, software, and calibration services such that radiation measurements from the system are presentable in a court of law. Focus group participants considered this to be an essential feature.

Frequency of repair or service refers to the number of times per year that the equipment needs to be serviced or repaired by the vendor. This includes routine maintenance service.

Quality of customer support refers to the overall quality of customer support provided by the vendor. Factors influencing quality of customer support include the ability to quickly speak with support personnel, receive answers to technical questions, and get help in troubleshooting the system.

Amount of downtime refers to the amount of time that the system is unavailable due to needed repairs or routine service.

Functional test with check source refers to the availability and ease of use of one or more test routines built into the system. Test routines allow the operator to place a check source in the vicinity of the detectors to ensure proper energy calibration and operation of the system.

Ease of troubleshooting refers to the ability of operators to determine the cause of problems encountered with the equipment. This was important to the focus group participants because identifying the problem often allows them to avoid substantial expense and downtime involved with returning the equipment to the vendor for repair.

Modular design refers to the ability to easily add, remove, and replace components of the system, especially detectors. Focus group participants wanted SRD systems to allow for additional and different sized detectors.

Time that vendor supports model refers to the period of time that the vendor will support the particular model with service, repairs, and customer support. Focus group participants have experienced buying equipment and then having the vendor discontinue support for the model after a short time.

Service location flexibility refers to flexibility on the part of the vendor as to where the equipment will be repaired. Some vendors require shipping the equipment to their repair facility. Focus group participants wanted the option of having the vendor send a repair technician to their facility.

Software updates refers to the availability and ease of installation of software updates to the system.

3.4 Usability

Ten usability criteria were identified and defined by the focus group as follows:

Simplicity of operation refers to the ability to operate the system easily, without confusion, and with minimal training. Focus group participants considered this to be an essential feature.

Intuitive display refers to having system data, such as radiation exposure rates, alarms, spectra, and isotopes, displayed in a clear and intuitive manner. Focus group participants pointed out that screen location, screen resolution, and quality of system software are major factors in an intuitive display.

Ease of use in moving vehicle refers to the ease of operating the system in a moving vehicle where factors such as bumps, vibrations, accelerations, and road noises are present.

Recall mode refers to the ability of the system to play back stored radiation data linked to location and time. Focus group participants wanted the ability to map radiation levels and have the data available for later use.

Alarms refers to the overall quality and clarity of radiation-related alarms produced by the system. Focus group participants wanted both audible and visible alarms and the ability to toggle either type on and off. They also indicated the importance of having flexible settings for controlling how alarms are triggered.

False positive alarm rate refers to the percentage of alarms in which the system mistakenly identifies an isotope that is not present. Focus group participants noted the importance of having a low false positive alarm rate due to the time and effort required to investigate such incidents.

Use by single operator refers to whether or not the system can be operated by a single operator. Some vehicle-mounted detection systems require two or more operators.

Spectral information display refers to the ability to display gamma spectra. Some vendors consider gamma spectra to be extraneous information that may confuse the user, but the focus group participants wanted to be able to see it.

Training mode refers to a system feature in which the software simulates sources and alarms for training purposes. Because most emergency response organizations do not have access to all the threatening materials that they may need to locate, the focus group participants wanted a training mode that can display all the indicators and alarms that would occur should such materials be detected.

Computer compatibility refers to whether or not the system software can operate on and/or communicate with other computer systems, such as a laptop computer.

3.5 Deployability

Ten deployability criteria were identified and defined by the focus group as follows:

Low visibility operation refers to the ability of the system to perform its functions in a manner in which no one but the operators will know that it is scanning for radioactive material. This was considered to be an essential feature by the focus group.

Power source options refers to the various means by which the system can be powered. These may include vehicle battery, standalone battery, generator, shore power, and backup battery. Focus group participants wanted the system to be able to operate with multiple power sources.

Battery operation time refers to the amount of time the system can operate on battery power if that is the sole means of power. Participants stated that they would not consider buying a battery-operated device that did not operate for at least 12 hours.

Vehicle adaptability refers to the ability of the system to operate in different vehicles and vehicle types and the ease with which it can be transferred. For systems that include a vehicle, participants preferred equipment that is mounted on a removable tray so that it can be transferred to another similar vehicle.

Equipment size refers to the size of equipment relative to the vehicle that it is mounted in. Participants wanted the equipment size to be appropriate for the application and to have additional capacity in the vehicle to allow for carrying extra equipment.

Ruggedness refers to the ability to withstand harsh operating environments and vehicular conditions, such as bumpy roads, turbulence, vibrations, and sudden acceleration and deceleration. Focus group participants stated that the detectors and related equipment must be resistant to vibration, in particular.

Environmental specifications refers to operating temperature, operating relative humidity, waterproofing, and dust-proofing. Focus group participants felt that the specifications must be appropriate for the operating environment, e.g., equipment placed on boats must be waterproof; equipment placed outside of the temperature-controlled environment of a vehicle must have a wide operating temperature range.

Connector quality refers to the specifications and overall quality of the physical connectors in the wiring system. Focus group participants have experienced substantial costs and loss of equipment time due to needed repairs caused by damaged connectors. They felt that high-quality connectors that meet military specifications should always be used.

Resistance to radio frequency interference refers to the ability of the system to withstand radio frequency (RF) interference. First responders use many different radios and wireless communication systems. Many of the focus group participants have experienced radio interference with electronic equipment and, therefore, were highly concerned about RF interference.

Temperature stability refers to a gamma or neutron detector's ability to maintain a stable reading when moving from a hot to a cold environment and vice versa.

4. EVALUATION CRITERIA ASSESSMENT RECOMMENDATIONS

Evaluation criteria can be assessed operationally or according to vendor-provided specifications. In an operational assessment, evaluators assess criteria based on their hands-on experience using the product. In a specification assessment, evaluators assess criteria based on product information provided by the vendor.

Table 4-1 presents the SAVER team's assessment recommendations for the evaluation criteria. Some criteria may be appropriate for either type of assessment.

Table 4-1. Evaluation Criteria Assessment Recommendations

Category	Criteria	Operational	Specification
Capability	Gamma detection	✓	
	Neutron detection	✓	
	Isotope identification	✓	
	Detection sensitivity	✓	
	Field-of-view	✓	
	Position capability	✓	
	Reachback capability	✓	
	Source localization	✓	
	Wireless capability	✓	✓
	Remote paging		✓
	Command center connectivity		✓
	Environmental mode capability		✓
	Imaging capability	✓	
Affordability	Initial cost		✓
	Maintenance cost		✓
	Terms of service contract		✓
	Training cost		✓
	Repair cost		✓
	Trade-in value/disposal options		✓
Maintainability	Legally defensible data		✓
	Frequency of repair or service		✓
	Quality of customer support		✓
	Amount of downtime		✓
	Functional test with check source	✓	
	Ease of troubleshooting		✓
	Modular design	✓	✓
	Time that vendor supports model		✓
	Service location flexibility		✓
	Software updates		✓
Usability	Simplicity of operation	✓	
	Intuitive display	✓	
	Ease of use in moving vehicle	✓	
	Recall mode	✓	
	Alarms	✓	
	False positive alarm rate	✓	
	Use by single operator	✓	
	Spectral information display	✓	
	Training mode		✓
	Computer compatibility		✓
Deployability	Low visibility operation	✓	
	Power source options		✓
	Battery operation time		✓
	Vehicle adaptability		✓
	Equipment size	✓	
	Ruggedness	✓	✓
	Environmental specifications		✓
	Connector quality		✓
	Resistance to radio frequency	✓	✓
	Temperature stability	✓	✓

5. ASSESSMENT SCENARIO RECOMMENDATIONS

The focus group identified many different applications in which they use SRDs. They use boat-mounted SRDs to search marinas, ferry terminals, and other boats and ships. On land they use SRD vehicles for pre-event screening, Presidential route screening, large area searches, screening traffic at chokepoints, scanning traffic at patrolling speed, scanning large storage facilities, and mapping radiation levels across large areas. The focus group participants did not have extensive experience with aircraft-mounted SRDs. Based on these applications, the focus group recommended several scenarios in which products could be assessed using the evaluation criteria recommended for an operational assessment (Table 4-1).

5.1 Chokepoint Screening at an Event

An SRD is parked at a traffic chokepoint at an entrance to a large stadium where a major sporting event is taking place. Traffic is reduced to a low rate of speed. However, a large number of vehicles need to be scanned and traffic flow must not be severely disturbed. Assessors use the SRD with their standard procedures to search for threatening radiological material.

5.2 Vehicle Scanning

An SRD driving along a residential neighborhood is used to scan parked vehicles along the roadside. One out of several vehicles contains a radiological source. The test is repeated with sources of different isotopes placed in different vehicles.

5.3 Searching/Mapping a Large Area

Intelligence sources indicate that a terrorist cell is operating in a certain area with plans to construct a radiological dispersal device. Assessors must search a parking lot outside of a housing complex for any threatening radiological material. Since the location must be searched more than once, they must also record radiation levels along a grid, thus mapping the normal background radiation of the area.

5.4 Marina Search

An SRD mounted in a boat is used to search for radiological sources placed in another boat at a large marina. The assessors must locate the boat and identify the source(s).

6. PRODUCT SELECTION RECOMMENDATIONS

The focus group was provided a list of commercially available SRD products (Table 6-1), and they had a lively discussion about selecting products to assess. Focus group participants were very familiar with SRDs that their organizations own and were willing to loan their product for an assessment, but they did not want to limit consideration to just the products they own. They stated that they wanted more information about the SRD products listed. Because a market survey report has not yet been completed for SRDs, they wanted to wait until more information is obtained via a market survey before deciding on product selection recommendations.

Table 6-1. Commercially Available SRDs

Vendor	Product
Mirion Technologies, Inc.	SPIR-Ident Mobile
NucSafe Inc.	Aerial Radiation Detection, Identification, and Mapping System (ARDIMS)
NucSafe Inc.	Mobile Guardian Defender™
NucSafe Inc.	Maritime Guardian Defender™
NucSafe Inc.	PUMA Lithium-6 Panel Array
ORTEC®	Interchangeable Detector Module (IDM)
ORTEC	Detective-200™
ORTEC	NaI-SS
Radiation Solutions Inc.	RS-500 Airborne
Radiation Solutions Inc.	RS-700 Mobile
Raytheon Co.	ASP-L
Textron Systems Corp.	Adaptable Radiation Area Monitor (ARAM)
Thermo Scientific Inc.	Mobile Detection System (MDS)
Thermo Scientific Inc.	Advanced Radioisotope Identification System (ARIS)

7. FUTURE ACTIONS

A questionnaire will be sent to all vendors of SRDs for the purpose of preparing a market survey report. The questionnaire will ask for specifications for evaluation criteria identified by the focus group. When a market survey report has been prepared it will be sent via e-mail to all the focus group participants, and they can then recommend products for the assessment.

The National Urban Security Technology Laboratory will coordinate an assessment by contacting vendors and first responder organizations with the intent of borrowing the products recommended by the focus group. The focus group recommendations will be used to guide the development of a SAVER assessment. Once the assessment is complete, the results will be available through on the SAVER website at www.dhs.gov/science-and-technology/SAVER.

8. ACKNOWLEDGEMENTS

The SAVER Program thanks the focus group participants for their valuable time and expertise. Their insights and recommendations will guide the planning and execution of the assessment of SRDs as well as future SAVER projects. Appreciation is also extended to the home jurisdictions of the participants for allowing them to participate in the focus group.

APPENDIX A. DEFINING AN SRD

It is difficult to find a precise definition for an SRD. The concept of standoff distance can also be confusing. Some people think that a standoff detector must be able to measure radiation at a distance for safety reasons. Others believe that it must be able to detect a specified amount of special nuclear material at a certain distance. The focus group was asked to give their opinions on what does and does not constitute an SRD based on their operational expertise.

The focus group agreed with the SAVER characterization of an SRD given in Section 1. They felt that a certain standoff distance was necessary not for safety concerns but so that they could scan vehicles and people covertly. They did not believe there should be a specific distance requirement, but the system should be able to detect sources at a distance that is appropriate for the application. The focus group also would consider backpacks to be SRDs if they have gamma spectroscopic capability or if they can be used to supplement an SRD system with gamma spectroscopy. Most backpack systems today are not spectroscopic, but the next generation of backpack systems will likely have this capability.

To summarize, the focus group felt that a radiation detection system can be considered to be an SRD if it has the following properties:

- Larger than personal and handheld radiation detectors;
- Can determine the direction of radiation sources;
- Can distinguish threats from background and normally occurring radiation;
- Vehicle mounted; and
- Can detect radioactive sources from a standoff distance that depends on the application.

The focus group also defined a set of criteria that they believe is essential for an SRD. Without these capabilities they would not consider buying the product:

- Gamma detection;
- Neutron detection;
- Isotope identification;
- Detection sensitivity appropriate for the application;
- Wide vertical and horizontal field-of-view;
- Competitive initial cost;
- Competitive maintenance cost;
- Legally defensible data;
- Simplicity of operation;
- Low visibility operation;
- Multiple options for powering the system; and
- Long battery operation time.